

Technology Opportunity

Technology Transfer & Partnership Office

TOP3-00208

Aero-Acoustic Propulsion Laboratory

Facility

The Aero-Acoustic Propulsion Laboratory (AAPL) is a world-class facility providing outstanding testing services in aircraft noise reduction, with an emphasis in engine nozzle and fan components. A large far-field arena is used at the Nozzle Acoustic Test Rig (NATR) to acquire flyby and sideline acoustic data of nozzle concepts at simulated flight conditions up to Mach 0.35.

Facility Benefits

AAPL provides three state-of-the-art acoustic test rigs:

- Nozzle Acoustic Test Rig (NATR)—supporting aircraft nozzle acoustic research
 - Free-jet acoustic tunnel simulating flight conditions up to Mach 0.35
 - High Flow Jet Exit Rig (HFJER) used to simulate nozzle pressure and temperature conditions
 - Large far-field acoustic measurement arena used to acquire sideline and flyby acoustic data measurements
- Small Hot Jet Acoustic Rig (SHJAR)—supporting jet noise fundamental research
- Advanced Noise Control Fan (ANCF)—supporting fan acoustic research
- Advanced diagnostic testing capabilities
- State-of-the-art control room
- In-house and private industry research programs
- Highly qualified staff of technicians, engineers, researchers, and operators

Commercial Applications

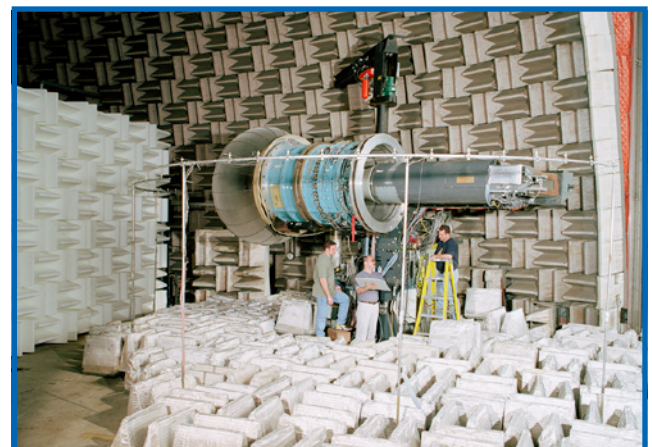
The dome provides an anechoic testing environment for acoustic measurements of aeropropulsion components.

Programs and Projects Supported

- Fundamental Aeronautics Subsonic and Supersonic Research
- Quiet Aircraft Technology (QAT)
- Ultra-Efficient Engine Technology (UEET)
- Low Emissions Alternative Power (LEAP)



Aero-Acoustic Propulsion Laboratory (AAPL) Dome.



Advanced Noise Control Fan (ANCF) in compact acoustic arena.

Capabilities

AAPL	
Test section speed, Mach	0.10 to 0.35
Simulated alt., ft	Sea level
Dynamic pressure, lbf/ft ²	NPR = 4.5 T = 1425 °F
Test section total temperature, °R	Ambient
Auxiliary air supply	
At 150 psig	130 lbm/s
At 450 psig	30 lbm/s
Model exhaust	Heated
Fuels	Natural gas Gaseous H ₂

Facility Testing Information

<http://facilities.grc.nasa.gov>

Contacts

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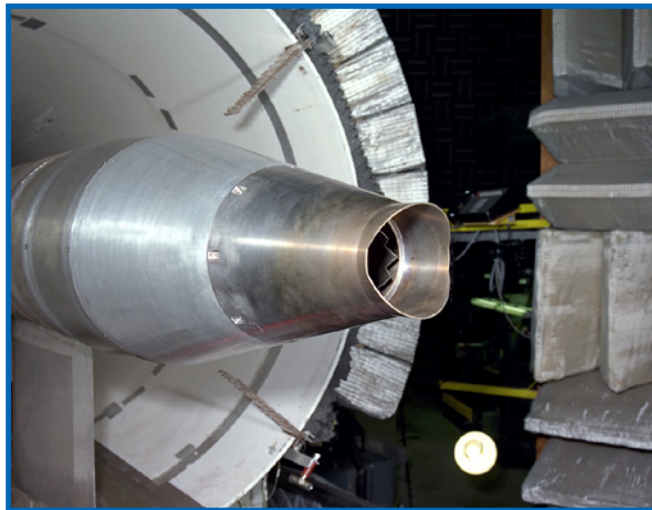
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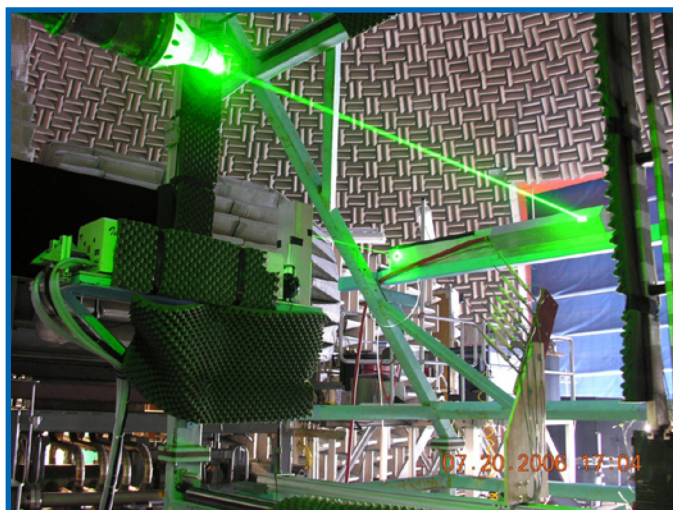
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<http://technology.grc.nasa.gov>



Nozzle Acoustic Test Rig (NATR).



Small Hot Jet Acoustic Rig Particle Image Velocimetry Test.

M-1625-10
Oct 07